

**Attachment Number B to the  
Memorandum of Understanding (LIGO-M950025-00-M)**

**between the**

**Australian Consortium for Interferometric Gravitational Astronomy  
(ACIGA)**

**and the**

**Laser Interferometer Gravitational Wave Observatory (LIGO) Laboratory**

**August 15, 1999**

This Attachment to the Memorandum of Understanding LIGO-M950025-00-M covers the role of the Australian Consortium for Interferometric Gravitational Astronomy (ACIGA) as a Charter Member of the LIGO Scientific Collaboration (LSC) and a member of the Isolation/Suspension/Thermal Noise Development Group (ISTNDG). The period of performance for the activities in this Attachment is from August 15, 1999 to February 15, 2000. This period may be modified by agreement to a revision of this Attachment.

1. LIGO Scientific Collaboration - The LIGO Scientific Collaboration is organized as a separate organization from the LIGO Laboratory. It includes scientists from the LIGO Laboratory, and those from collaborating institutions, and has its own leadership and governance. The Collaboration will ensure equal scientific opportunity for individual participants and institutions. It will organize the research, publications, and all other scientific activities. The Collaboration will report to the Laboratory Directorate for final approval of its research program, technical work, observational physics publications, and talks announcing new observations and physics results. This will be done through regular reports to the Directorate and its PAC.
2. Charter Membership - An initial period for formation of the Charter group of institutions in the LIGO Scientific Collaboration commenced on March 1, 1997 and ended following the first full meeting of the Collaboration at which the Collaboration Council assumed its role.

Following the charter period proposals will be evaluated through the Collaboration Council. With Collaboration approval, an MOU with the LIGO Laboratory, including Attachments defining specific work, will be required for any participating institutions.

3. This document is an agreement between the Australian Consortium for Interferometric Gravitational Astronomy (ACIGA) and the LIGO Laboratory concerning the activities of ACIGA as a Collaborating Institution in the LIGO Scientific Collaboration (LSC) and in the Isolation/Suspension/Thermal Noise Development Group (ISTNDG), and as indicated in Item No. 8 below.
4. Isolation/Suspension/Thermal Noise Development Group - The Isolation/Suspension/Thermal

Noise Development Group (ISTNDG) is the scientific collaboration for defining and developing future isolation and suspension improvements for use in advanced subsystems for the initial LIGO interferometers or in entirely new advanced interferometers. A specific Attachment will define the roles and responsibilities of groups in this development group. Members of this group will normally be authors on publications reporting the work of the group and will normally be eligible to participate in data runs and science beyond the LIGO I data run.

5. Report of Progress - ACIGA will provide a status report on its activities in support of LIGO every six months. The report will consist of: a) a summary status on research by topic as indicated Item No. 8 below including progress against the milestones if any, significant accomplishments such as new insights/discoveries or publications, issues of concern if any, and an indication of invested time, b) updated List of Collaborators, and c) a plan of activities for the succeeding six-monthly period. The report will be due one month before the close of the period of performance under the Attachment in question.
6. Term of Membership - The Membership will be renewed every six months upon evidence of satisfactory performance of agreed upon duties.

The coordinates of ACIGA members are included in the Attachment Z to the Memorandum of Understanding LIGO-M950025-00-M.

7. Intellectual Property Rights - The rights to intellectual property developed under this Attachment will be subject to the National Science Foundation Grant Policy as indicated in Section 730, Intellectual Property.
8. During the period August 15, 1999 to February 15, 2000 the ACIGA is developing an experiment to directly measure the frequency distribution of thermal noise. The initial focus is on determining the thermal noise of a flexure mount which holds one mirror of a cavity. The cavity will be attached to an optical bench which will be suspended in a vacuum. The ACIGA groups will participate as follows:

Australian National University (ANU) will:

- a) Test a new cavity locking system based on tilt locking.
- b) Design the flexure mount.
- c) Design the cavity and readout system.

The University of Adelaide is determining the front-end requirements for the thermal noise experiment. Specifically, the Adelaide group will determine the frequency and intensity stability requirements and develop such a system for incorporation with the ANU cavity, as follows:

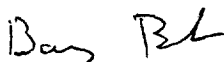
- a) Complete refurbishment of the vibration pre-isolator for the reference and test cavity.

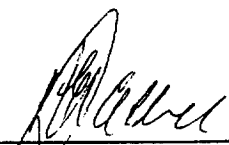
- b) Completely refurbish of the vacuum vessel.
- c) Complete construction of the electronics for the Pound-Drever-Hall servo control of the reference and test cavities.
- d) Assemble the reference cavity and lock it to the laser.

University of Western Australia (UWA) will:

- a) Complete the design for the optical isolator, with pre isolation and self damping, and of the optical bench to be suspended from it.
  - b) Measure the Q factor of the Nb flextures.
9. During the period August 15, 1999 to February 15, 2000, the LIGO Laboratory will share as requested and appropriate the LIGO data of relevance to the research topics in Item No. 8 above.
10. The research effort pursuant to this Attachment B will be coordinated by David McClelland and Syd Meshkov on behalf of ACIGA and LIGO Laboratory respectively.
11. Resource Sharing: The LIGO Laboratory will contribute resources including allocation of appropriate scientific and engineering personnel, research facilities and funding in support of the effort in Item No. 8, as indicated below. These resources will be in addition to the coordination effort and data to be made available per Item No. 9 above.
- a) Provide accommodations for investigators from other institutions in Item No. 8 above while on LIGO research assignment at Caltech, and/or LIGO sites.

Approved:

  
\_\_\_\_\_  
Barry Barish  
LIGO Laboratory Director

  
\_\_\_\_\_  
David McClelland  
ACIGA Principal Investigator

3/6/00  
\_\_\_\_\_  
Date

3/16/00  
\_\_\_\_\_  
Date